From: "Zhen, Davis"
To: younghs@cdmsmith.com
CC: "Sheldrake, Sean" <sheldrake.sean@epa.gov>
"Scott Coffey" <coffeyse@cdmsmith.com>
"Silvertooth, Jason R." <silvertoothjr@cdmsmith.com>
"Miner, Libby" <minerl@cdmsmith.com>
Date: 6/14/2018 10:58:28 AM
Subject: Re: Update on bathymetric field work - single beam echosounder data collection with personal water crafts

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Sounds good to me Howard, thanks for the update.

Thanks,

Sent from my iPhone, please excuse typos
****
Davis Zhen, Manager
Site Cleanup Unit 2
Office of Environmental Cleanup
1200 Sixth Avenue Suite 155
M/S ECL – 122, Seattle, WA 98101
Tel: (206) 553-7660
Cell: (206) 437-5826
****

On Jun 14, 2018, at 10:53 AM, Young, Howard S. <younghs@cdmsmith.com> wrote:

> Sean and Davis,
> Jason completed the oversight this morning and the surveyors have moved into the river to start surveying the fill (data gap) areas. He observed the QC checks which included base station GPS horizontal and vertical position checks on the PH1 bench mark, pole echosounder depth check, and sound velocity measurement and all were within spec. Health and safety measures were according to their HASP addendum and the surveyors donned drysuits, PFDs, gloves. The two personal water crafts (PWCs) stay within line of site all day and have marine radios monitoring channel 16.
> Jason got clarification on your two points below:
> 1. Data gap coverage verification – the surveyors have a display on the PWC that shows the data gap areas, existing bathymetry coverage, planned cross lines and check lines, and actual measurement locations. The surveyors use this to ensure that they have covered the planned area sufficiently. We will get maps in the morning that show the actual survey coverage areas per Ken's email below.
> 2. Wave interference – For larger waves, the surveyors pause the survey until the waves pass. For smaller waves, any "noise" is handled by the high frequency of sonar (5 times a second) and GPS readings and the 4 degree beam width (cone shaped beam allow for some tilting of the vessel on roll and pitch axis). The computer processing can recognize and process the wave effects using the multiple sonar pings and travel time but that is not done until the processing phase in the office.
>
> The surveyors are expected to return sometime between 5:30 and 6 PM and will get the PWCs out of the water and do an end of the day position check at PH1. Given that the PH1 check is the only activity for us to observe at the end of the day and that the morning PH1 check was within 0.05 feet on all three axes I don't know if there is much value in end of day oversight. I recommend that we continue oversight in the morning attending the tailgate safety meeting, get an update on work completed previous and planned for the day, and observe the position checks. We could also review the coverage maps when they email them out. Let us know if you would like us to make another end of day site visit or have any questions on the work.
>
> Thanks
>
> Howard S. Young, LG | CDM Smith

14432 SE Eastgate Way, Suite 100 | Bellevue, WA 98007-6493
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From: Sheldrake, Sean <sheldrake.sean@epa.gov>
Sent: Thursday, June 14, 2018 7:57 AM
To: Young, Howard S. <younghs@cdmsmith.com>
Cc: Zhen, Davis <Zhen.Davis@epa.gov>; Coffey, Scott <CoffeySE@cdmsmith.com>; Silvertooth, Jason R. <silvertoothjr@cdmsmith.com>; Miner, Libby <minerl@cdmsmith.com>
Subject: Re: Upcoming Bathy Field Work - questions on the single beam echosounder data collection deliberative

I agree Howard I think they need to set up a laptop or some kind of viewing station at the boat launch to verify there are no data gaps before Demob and ideally each day.

I'd also suggest if possible that the data be checked for noise that would've been caused by a pass during High wave activity, if you can.

Thanks

Sean Sheldrake, RPM
Unit Diving Officer
206.225.6528
Sent from my iPhone

On Jun 14, 2018, at 7:38 AM, Young, Howard S. <younghs@cdmsmith.com> wrote:

> Davis and Sean,
> Jason Silvertooth is out there this morning to participate in the start up of this work at the Swan Island boat launch and Julee is providing oversight on the sediment sampling vessel.
> Under their first response they indicate that they each morning they will have combined coverage of the previous days surveying available via emailed images. I think it important that we get those images promptly each morning to review and make sure they are covering the areas that have no data and have time to communicate any issues to the PreRD Group before they demobe.
>
> Howard S. Young, LG | CDM Smith
> 14432 SE Eastgate Way, Suite 100 | Bellevue, WA 98007-6493
> T: 425.519.8300 | Direct 425.519.8351 | Cell 206.491.4663 | younghs@cdmsmith.com | www.cdmsmith.com

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> From: Coffey, Scott
> Sent: Wednesday, June 13, 2018 4:43 PM
> To: Zhen, Davis <Zhen.Davis@epa.gov>; Sheldrake, Sean <sheldrake.sean@epa.gov>; Young, Howard S. <younghs@cdmsmith.com>
> Subject: RE: Upcoming Bathy Field Work - questions on the single beam echosounder data

collection

I read the answers and I think they're planning sufficient QA activities, which we'll document during our oversight visits and I think they address the wave issue appropriately. We will also record their sound speed vs pole sounding checks for calibration.

Scott

From: Zhen, Davis <Zhen.Davis@epa.gov>
Sent: Wednesday, June 13, 2018 4:31 PM
To: Sheldrake, Sean <sheldrake.sean@epa.gov>; Young, Howard S. <younghs@cdmsmith.com>; Coffey, Scott <CoffeySE@cdmsmith.com>
Subject: Fwd: Upcoming Bathy Field Work - questions on the single beam echosounder data collection

This could create some potential issues on QA and our acceptance of the data.

Thanks,

Sent from my iPhone, please excuse typos
****
Davis Zhen, Manager
Site Cleanup Unit 2
Office of Environmental Cleanup
1200 Sixth Avenue Suite 155
M/S ECL – 122, Seattle, WA 98101
Tel: (206) 553-7660
Cell: (206) 437-5826
****

Begin forwarded message:

> From: "Tyrrell, Ken" <ken.tyrrell@aecom.com>
> Date: June 13, 2018 at 4:23:58 PM PDT
> To: "Zhen, Davis" <Zhen.Davis@epa.gov>
> Cc: Scott Coffey <coffeyse@cdmsmith.com>
> Subject: RE: Upcoming Bathy Field Work - questions on the single beam echosounder data collection
>
> Davis,
>
> Here are the replies to your questions. Keep in mind the figures/maps of intended coverage areas were sent previously.
>
> - How will coverage displays of acquired bathymetry data be generated in the field? Existing real-time coverage will be displayed on the display screen on the Personal Watercraft (PWC). As single beam data is acquired, data will be painted to the screen on each individual PWC. See Bathy FSP Appendix A – Figure 4 for photo of display screens
>
>   EPA's expectation are that oversight inspectors will be able to observe the coverage displays as data is collected throughout the day? There is not a feasible way to provide inspector oversight of coverage during operations. The PWCs will be working small pockets with no shore access. Further, each

PWC will only show coverage for the day for that unit. Combined coverage would be available the following morning via email images as the effort of merging the data will occur back in the DEA office to generate coverage images for the previous days effort. As access allows through private properties, EPA could observe from land at the areas being surveyed.

- What specific quality control tests will be performed to verify calibration of the single beam echosounder and what is the frequency and location of these tests? Checks will include a position check and sonar derived elevation check. A start of PWC acquisition position check will be conducted for each PWC. Additional position checks provide no further value as the GPS base station is fixed and not deployed daily. After a sound speed observation is made and entered into each PWC, a start of acquisition and end of last day of acquisition pole sounding on the river bed at the Swan Island Boat Ramp with an RTK GPS observation of the water line will be observed. The river bed elevation computed from subtracting the pole sounding from the water elevation will be compared to the processed single beam elevation of the river bed. If the water is shallow, the RTK GPS will be used to take a direct reading in the river bed. Sound speed profiles will be acquired in each fill area to be surveyed and applied during processing if there is a significant change.

- At what location and frequency will check-lines be run for quality analysis of the single beam data and how will the cross-line data be checked in the field to verify sonar swath angle used on a flat bottom meets the survey accuracy? Cross line checks are not compared in the field, even with multibeam data. This is a post mission check after data has been processed. That said, one PWC single beam cross-line per area will be run as well as overlap of existing multibeam data for later analysis. As per the Bathy FSP - Appendix A, crossline comparisons will be conducted to document that sensor biases, GNSS height data and echosounder data, and sound velocity profiles are accounted for in the data set. A statistical analysis of the crossline comparisons will be conducted using CARIS HIPS which provides a report, compiling statistics by beam number for each junction. In addition, a statistical analysis of the cross-line data to main scheme survey lines will be conducted and included in the survey report.

- What control points will be used to check the horizontal accuracy of the GPS and how frequently will the checks be done? Consistent with the approved SOP for Horizontal and Vertical Survey Control in the Surface Sediment FSP, position checks would occur at the designated monument, PH-2 benchmark location, at the boat launch located in Swan Island Lagoon. This will occur at the start and end of the day for each PWC.

- How will the vertical accuracy of the single beam echosounder be checked and at what frequency? As mentioned above vertical accuracy will be checked daily at the start and end of the day for each PWC. Additionally, vertical accuracy will be checked at the start of acquisition and end of last day of acquisition pole sounding on the river bed at the Swan Island Boat Ramp and when comparing to cross line and multibeam data.
- How will the effects of wave action on depth measurements be evaluated and what is the maximum wave height that will be allowed during the single beam echosounder measurements? The RTK GPS height is recorded at 5 hertz (5 times per second) and will be used to correct for vertical motion of the PWC. The beam angle of the single beam transducers is 4 degrees and will take the shortest path to the riverbed which will take into account vessel role or pitch of +/- 4 degrees.

From: Zhen, Davis [mailto:Zhen.Davis@epa.gov]
Sent: Tuesday, June 12, 2018 4:41 PM
To: Tyrrell, Ken <ken.tyrrell@aecom.com>
Cc: Scott Coffey <coffeyse@cdmsmith.com>
Subject: Upcoming Bathy Field Work - questions on the single beam echosounder data collection

Ken,

Per our conversation earlier, below are the questions we have regarding your upcoming Bathymetry field work.

Thanks,

Sent from my iPhone, please excuse typos
****
Davis Zhen, Manager
Site Cleanup Unit 2
Office of Environmental Cleanup
1200 Sixth Avenue Suite 155
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Tel: (206) 553-7660
Cell: (206) 437-5826
****

Davis,

We have included the following questions on how the personal water craft single bean echosounder survey will be conducted for planning EPA oversight. Please let us know if you have any questions.

- How will coverage displays of acquired bathymetry data be generated in the field? EPA's expectation are that oversight inspectors will be able to observe the coverage displays as data is collected throughout the day?

- What specific quality control tests will be performed to verify calibration of the single beam echosounder and what is the frequency and location of these tests?

- At what location and frequency will check-lines be run for quality analysis of the single beam data and how will the cross-line data be checked in the field to verify sonar swath angle used on a flat bottom meets the survey accuracy?

- What control points will be used to check the horizontal accuracy of the GPS and how frequently will the checks be done?

- How will the vertical accuracy of the single beam echosounder be

- checked and at what frequency?

- How will the effects of wave action on depth measurements be evaluated and what is the maximum wave height that will be allowed during the single beam echosounder measurements?

EPA's expectations are that oversight inspectors will be able to observe the quality control checks throughout the survey.

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From: Tyrrell, Ken <ken.tyrrell@aecom.com>
Sent: Tuesday, June 12, 2018 1:05 PM
To: Zhen, Davis <Zhen.Davis@epa.gov>
Cc: Coffey, Scott <CoffeySE@cdmsmith.com>; Young, Howard S. <younghs@cdmsmith.com>; Jon Dasler (Jld@deainc.com) <Jld@deainc.com>
Subject: FW: An Update -- Upcoming Bathy Field Work

Davis,

An update on the Bathy field work (see below).

Ken

From: Jon Dasler [mailto:Jld@deainc.com]
Sent: Tuesday, June 12, 2018 11:43 AM
To: Tyrrell, Ken <ken.tyrrell@aecom.com>
Cc: Pretare, Jennifer <jennifer.pretare@aecom.com>; Luke Smith (Luke.Smith@Geosyntec.com) <Luke.Smith@Geosyntec.com>
Subject: RE: Upcoming Bathy Field Work

Ken

Given the forecast now calling for 70% chance of rain for Wednesday, we are moving our operations start to Thursday. I reviewed coverage priorities with Luke. We will have graphics of our line plan for proposed coverage later today.

Jon

Jon L. Dasler, PE, PLS, CH | Senior Vice President, Director of Marine Services
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PRIVILEGED AND CONFIDENTIAL/JOINT DEFENSE COMMUNICATION /ATTORNEY WORK PRODUCT

From: Tyrrell, Ken [mailto:ken.tyrrell@aecom.com]
Sent: Tuesday, June 12, 2018 8:52 AM
To: Zhen, Davis <Zhen.Davis@epa.gov>
Cc: Scott Coffey <coffeyse@cdmsmith.com>; Young, Howard S. <younghs@cdmsmith.com>; Jon Dasler <Jld@deainc.com>
Subject: FW: Upcoming Bathy Field Work

Davis,

We are providing the below note from Jon Dasler w/ DEA in an effort to keep you current and up to date about the upcoming Bathymetric Field Work.

We will continue to keep you up to date as the plans and logistics are finalized.

See below.

Ken Tyrrell
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From: Jon Dasler [mailto:Jld@deainc.com]
Sent: Monday, June 11, 2018 3:04 PM
To: Tyrrell, Ken <ken.tyrrell@aecom.com>; Luke Smith (Luke.Smith@Geosyntec.com) <Luke.Smith@Geosyntec.com>
Cc: Moody, Nicky <nicky.moody@aecom.com>; Keith Kroeger <KKroeger@Geosyntec.com>
Subject: RE: EPA Requested Info on Upcoming Bathy Field Work

Ken

I will put together a line plan for this effort and have something tomorrow. We are looking at acquisition Wednesday through Friday if needed. We cannot take any observers on the personal watercraft. Crew would launch at St Johns or Swan Island depending on operations for the day. I will have more details tomorrow.

Jon

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